

AbstractID: 6635 Title: Preliminary results of organ motion during instructed breath-hold in gated radiotherapy

By studying those patients who have clear anatomical markers such as Barium in the esophagus and stomach, or brachytherapy dummy wires in the lung, we have established that the diaphragm motion is the largest. If one can control the diaphragm motion to an acceptable level, the motion of other moving organs may also be acceptable for radiotherapy. Such levels depend on several factors, the patient's medical status, the anatomical site, the image quality and the patient positioning accuracy. Considering the fact that typical organ motion near the diaphragm moves anywhere from 1.5 cm to up to 3 or 4 cm, we feel compelled to reduce the diaphragm motion to less than 5 mm in this preliminary study. To achieve this goal, we have used a combination of traditional voltage gating and breathing-based time-sequence gating. We have followed two patients for this study. During the audio training session the patient is given audio instruction to follow a "breath-in, breath-out, breath-in, breath-out and hold" pattern. The length of the breath-hold and gate levels are determined in this training session. Thereafter, we have captured fluoroscopic images once or twice and portal images for two weeks under the same audio instruction. From fluoroscopic images, the intra-diaphragm motion during non breath-hold is found to vary 2 to 3 cm whereas the same organ motion is reduced to approximately 3 mm during breath-hold. Portal image analysis (inter-treatment variations) was somewhat difficult due to the poor image quality. However, organ motion observed on the portal images is reduced to approximately 5 mm.